The Magazine of useful and entertaining knowledge

Mechanics' & Farmers'

MAGAZINE

OF USEFUL KNOWLEDGE.

"GET WISDOM: AND WITH ALL THY GETTING, GET UNDERSTANDING."

VOL. I. NEW-YORK, JUNE 15, 1830. No. 1.

The present is the first number of a Magazine, which, should it meet with sufficient encouragement, we propose to publish semi-monthly: it is submitted to the public, with the hope, that it will meet their approbation, and receive a liberal share of their patronage: it rests with them, either to bid it live and be useful, or to suffer it to die for want of nourishment. It may, perhaps, be considered superfluous, at this time, to point out the advantages of general and scientific knowledge; they are too obvious to have escaped the notice of the most superficial observer. But though all confess its value and importance, yet, it is to be regretted there are many, *very* many, who, either through indolence, an apprehension that it is beyond their reach, or from an unwillingness to incur the trifling expense of books, &c., suffer themselves and their children to grow up in ignorance of many of the most simple, but at the same time most interesting laws and operations of nature; a knowledge of which, in many instances, could scarcely fail to be of great advantage to them, even in a pecuniary point of view. "The first feeling," says the North American Review, "in many persons to whom this sort of knowledge is proposed for their acquisition, is a vague feeling of utter incompetency to the undertaking, or of the absolute impossibility or impropriety of the thing. "We cannot know any thing about these matters," say they, "they are for scholars to understand." And why can they not know? The objects to be examined, are all around them; the subjects for study are the elements with which they are every moment conversant; the instruments are their senses; to see, to hear, is to know.

The times for study are all times that are not necessarily engrossed with other pursuits; when they take a walk, when they look around them upon the works of nature, especially when they are at leisure. Why cannot a man, who sits down before his evening fire, spend an hour in reading a few paragraphs that will teach him the curious and beautiful theory of combustion? Why cannot any man read enough upon the nature and changes of the atmosphere, the clouds, and the seasons, to be in the habit of reflecting, philosophically, on what is passing around him, instead of receiving, as passively, in this respect, as the post before his door, the visitations of the elements? And as to the time, "the time that makes a wise man, is the time that makes a fool; and the counters with which the untaught lose the game, are the same with which the skilful win it." The inquirer may begin his researches without stirring from the spot where he stands. He has only to revive the curiosity of childhood—a curiosity unhappily dulled by repeated disappointment; he has only to ask, What is this, and why is that? and he has begun the work of scientific philosophy. "True," some will say, "but all this requires a great deal of thinking, and our business is to labor." But why not join them? Need a man stop turning over the furrows of his field, because he observes the chemical properties of his soil? Must the builder pause in his work, because he proceeds upon a full understanding of the principles of mensuration and architecture? Does any artist labor less assiduously or effectually because he understands, not only the practice, but the philosophy, of his art? Does the merchant lay his plans less wisely, because he brings into his contemplation, a sagacious and comprehensive view of the principles of trade? The truth is, that, in all those cases, knowledge does not hinder, but helps, a man." In reply to these observations, it may be asked, "But suppose we should acquire all this knowledge which you so highly and strenuously recommend; what good would it do us? Where would be the use of it?" To these questions we will allow the same writer we have before quoted, to reply, and his reply is unanswerable.

"The spread of scientific knowledge—a knowledge in other words, of the mechanical powers, and of the capabilities of nature, would tend, and directly tend, to increase comfort and competence in the world. Science, it has been often said, is man's empire over nature. It is this that makes a large part of the difference between the barbarian, who is subject to the elements, and the civilized man, who commands them. It is this that, in civilized countries, is every day more and more rendering nature subservient to man's use,

for food, medicine, clothing, habitation, fuel, convenience, comfort. It is demonstrable, as a matter of the plainest inference, that he who works not as a senseless machine, but as an intelligent handicraftsman, who understands the powers he wields, and the implements and materials he works upon, will have a great advantage in his knowledge. The artisan, with this qualification, will be constantly improving his tools and the productions of his skill, and shortening the processes of his labor. The farm will be certain, other things being equal, to be better cultivated, and to be made more productive, by a scientific agriculturist. He will turn his stock as well as the soil of his farm to greater account, with the knowledge that books of science will give him." We might go on in this way enumerating the advantages to be derived from the acquisition of scientific knowledge, till we had filled a volume; but enough, we presume, has been said to convince the most doubting; if not, no arguments could disturb the settled complacency of their ignorance, and we must, therefore, leave them to believe, like the miserable Laplander, that no body enjoys greater happiness, or is more bountifully supplied with the luxuries of life, than themselves: we no more envy the condition of one, than we do the other. There is a class of persons whom we have not yet noticed, and who will probably excuse themselves from reading any thing of a useful nature, by alleging want of time; we refer to that class who spend a great portion of their time in reading light, trashy, and fictitious works: to these we will again allow the N. A. Review to speak. "One great evil of this sort of reading, is, that it trains no mental faculty, and awakens no intellectual effort; that, although it arouses the passions, it leaves the mind passive to the impressions made upon it. No intellect is more void of activity, more fatally dull, than that of the worn-out novel-reader. Scientific researches would produce a wholesome action, a salutary curiosity; and the gratification of this taste would not be confined to the pent-up room and the waning lamp, but would attend the cheerful walk, amidst the light breezes of day, and the rich and fair scenes of nature." It must be regretted that so large a portion of the time which is spent by the American people in reading is devoted to those kind of works which merely amuse for the moment, without improving the mind of the reader, or adding any thing to his stock of knowledge.

It will be the design of the Editor of the Magazine, to combine these two species of reading, and to make the work both *useful*

and *entertaining*. With this view, he will select such subjects as will, in the greatest degree, unite these qualities, such as Natural History; the most useful and interesting branches of Natural Philosophy; Agriculture; Horticulture; Domestic and Rural Economy; Biography, &c. &c.

In treating of these subjects, particular pains will be taken to render them as plain and easily understood, as their nature will admit, and in order that the reader may become well acquainted with the subjects, they will be treated systematically, no part being omitted that may be deemed essential to a right understanding of them. If, by adopting this plan, we shall succeed in arresting the attention of those who now read, but read to no purpose; of stimulating others to study the works of nature, and finally, of diffusing *useful knowledge* among all classes of the community, causing the light of intelligence to illumine, though with a feeble ray, the interior of every farm house, and making the long winter evenings pass more cheerfully and profitably;—we shall consider ourselves most fortunate and happy. The subjects treated of, particularly those of Natural History, and Natural Philosophy, will be illustrated by wood-cuts, and the work will be embellished by occasional likenesses, engraved on copperplate, of such men as have been eminent for their talents, learning, or philanthropy.

NATURAL HISTORY.

ON THE PROGRESSIVE SCALE OR CHAIN OF BEINGS IN THE UNIVERSE.

To men of observation and reflection, it is apparent, that all the beings on this earth, whether animals or vegetables, have a mutual connexion and a mutual dependence on each other. There is a graduated scale or chain of existence, not a link of which, however seemingly insignificant, could be broken without affecting the whole. Superficial men, or, which is the same thing, men who avoid the trouble of serious thinking, wonder at the design of producing certain insects and reptiles. But they do not consider that the annihilation of any one of these species, though some of them are inconvenient, and even noxious to man, would make a blank in nature, and prove destructive to other species, which feed upon them. These, in their turn, would be the cause of destroying other species, and

the system of devastation would gradually proceed, till man himself would be extirpated, and leave this earth destitute of all animation.

In the chain of animals, man is, unquestionably, the chief or capital link. As a highly rational animal, improved with science and arts, he is, in some measure, related to beings of a superior order, wherever they exist. By contemplating the works of nature, he even rises to some faint ideas of her great Author. Why, it has been asked, are not men endued with the capacity and powers of angels? beings of whom we have not even a conception. With the same propriety it may be asked, Why have not beasts the mental powers of men? Questions of this kind are the results of ignorance, which is always petulant and presumptuous. Every creature is perfect according to its destination. Raise or depress any order of beings, the whole system, of course, will be deranged, and a new world would be necessary to contain and support them. Particular orders of beings should not be considered separately, but by the rank they hold in the general system. From man to the minutest animalcule which can be discovered by the microscope, the chasm seems to be infinite; but that chasm is actually filled up with sentient beings, of which the lines of discrimination are almost imperceptible. All of them possess degrees of perfection or of excellence proportioned to their station in the universe. Even among mankind, which is a particular species, the scale of intellect is very extensive. What a difference between an enlightened philosopher and a brutal Hottentot! Still, however, nature observes, for the wisest purposes, her uniform plan of gradation. In the human species, the degrees of intelligence are extremely varied. Were all men philosophers, the business of life could not be executed, and neither society, nor even the species could long exist. Industry, various degrees of knowledge, different dispositions, and different talents, are great bonds of society. The Gentoos, from certain political and religious institutions, have formed their people into different castes or ranks, out of which their posterity can never emerge. To us such institutions appear to be tyrannical, and restraints on the natural liberty of man. In some respects they are so; but they seem to have been originally results of wisdom and observation; for, independently of all political institutions, nature herself has formed the human species into castes or ranks. To some she gives superior genius and mental abilities; and, even these, the views, the pursuits, and the tastes, are most wonderfully diversified.

In the talents and qualities of quadrupeds of the same species, there are often remarkable differences. These differences are con-

spicuous in the various races of horses, dogs, &c. Even among the same races, some are bold, sprightly, and sagacious. Others are comparatively timid, phlegmatic, and dull.

Our knowledge of the chain of intellectual and corporeal beings is very imperfect; but what we do know gives us exalted ideas of that variety and progression which reign in the universe. A thick cloud prevents us from recognising the most beautiful and magnificent parts of this immense chain of being. We shall endeavor, however, to point out a few of the more obvious links of that chain, which fall under our own limited observation.

Man, even by his external qualities, stands at the head of this world. His relations are more extensive, and his form more advantageous, than those of any other animal. His intellectual powers, when improved by society and science, raise him so high, that, if no degrees of excellence existed among his own species, he would leave a great void in the chain of being. Were we to consider the characters, the manners, and the genius of different nations, of different provinces and towns, and even of the members of the same family, we should imagine that the species of men were as various as the number of individuals. How many gradations may be traced between a stupid Huron, or a Hottentot, and a profound philosopher! Here the distance is immense; but nature has occupied the whole by almost infinite shades of discrimination.

'In descending the scale of animation, the next step brings us to the monkey tribe. Man, in many particulars, undoubtedly resembles the animals of this tribe, more especially in his bodily structure. But even in this respect, the lowest variety of the human species does not nearly so much resemble the highest of the apes, as the latter do the majority of quadrupeds. In short, notwithstanding the attempts of some philosophers to confound their own species with monkeys, it requires only a small share of knowledge of the anatomical structure of animals, and the general principles of natural history, to convince any one of the folly and absurdity of such speculations.

'In the families of bats, of carnivorous, and of gnawing animals, there is a gradual departure in their form and structure from that of the original standard, man. Instead of fingers fitted for delicate motions and sensations, they are possessed only of claws which are capable of far less varied application and utility; and passing on still farther, we find in the ruminating and pachyrdematous animals, the toes enveloped in hoofs of different sizes and numbers, which totally prevent them from being used for any thing but locomotion.

'There is not only this regular gradation among individuals belonging to the same class, but there are instances in which the individuals of different classes very nearly approach each other in certain particulars. The bat, the flying squirrel, the flying opossum, are instances of animals of the class mammalia, approximating to that of birds in the possession of wings or organs resembling them, whilst the ornithorhynchus resembles them in the structure of its mouth, and its mode of producing its young by eggs. On the other hand the ostrich, the cassowary and the dodo, which have wings so short as to be incapable of flying, and therefore always run or walk, are instances of birds approaching, in some degree, to the character of quadrupeds. So, too, the cetaceous tribe affords an example of the transition from the mammalia to fishes: the flying fish, of the transition from birds to fishes; the dragons, of that from birds to reptiles. Many other examples might be adduced in illustration of the same principle, among the vertebral animals; and among the invertebral, the connexions and relations of this sort are so numerous as to form a great obstacle to the proper division of them into classes and orders.

'All the substances we recognise on this earth may be divided into organized and animated, organized and inanimated, and unorganized or inert matter. The whole of these possess degrees of perfection, of excellence, or of relative utility, proportioned to their stations or ranks in the universe. Change these stations or ranks, and another world would be necessary to contain and support them. Beings must not be contemplated individually, but by their rank, and the relations they have to the constituent parts of the general system of nature. Certain results of their natures we consider as evils. Destroy these evils, and you annihilate the beings who complain of them. The reciprocal action of the solids and fluids constitutes life, and the continuation of this action is the natural cause of death. Immortality on this earth, therefore, presupposes another system; for our planet has no relation to immortal beings. Every animal, and every plant, rises, by gentle gradations, from an embryo, or gelatinous state, to a certain degree of perfection exactly proportioned to their several orders. An assemblage of all the orders of relative perfection, constitutes the absolute perfection of the whole. All the planets of this system gravitate toward the sun and toward each other. Our system gravitates toward other systems, and they to ours. Thus the whole universe is linked together by a gradual and almost imperceptible chain of existences both animated and inanimate. Were there no other argument in favor of the UNITY of

DEITY, this uniformity of design, this graduated concatenation of beings, which appears not only from this chapter, but from many other parts of the book, seems to be perfectly irrefragable.

'In contemplating man as at the head of those animals with which we are unacquainted, and viewing him in connexion with the economy of the world about him, it appears obvious that no sentient being, whose physical construction was more delicate, or whose mental powers were more elevated, than those of man, could possibly live and be happy here. If such a being really existed, his misery would be extreme. With senses more refined and acute; with perceptions more delicate and penetrating; with a taste so exquisite that the objects around him could by no means gratify it; obliged to feed upon nourishment too gross for his frame: he must be born only to be miserable, and the continuation of his existence would be utterly impossible. Even in our present condition, the sameness and insipidity of objects and pursuits, the futility of pleasure, and the infinite sources of excruciating pain, bring constantly to our minds a conviction of the imperfections attendant on our present state of being. Increase our sensibilities, continue the same objects and situation, and no man could bear to live. Let man, therefore, be contented with the powers and the sphere of action assigned him. There is an exact adaptation of his powers, capacities and desires, both bodily and intellectual, to the scene in which he is destined to move. His station in the scale of nature is fixed by wisdom. Let him study the works of nature, and find in the contemplation of all that is beautiful, curious and wonderful in them, proofs of the existence and attributes of his Creator. Let him see in his own structure and that of all other animals, and in the whole economy of the universe, animate and inanimate, the evidences of the wisdom, the skill, the benevolence, and the justice, of that great and overruling Intelligence, who has made all things, and who upholds all things. Let him find in the contemplation of the final destiny which is promised him, a source of consolation for the imperfections, pains and trials, of the present state of being. Let him fill up his rank here with dignity, and consider every partial evil as a cause, or an effect, of general ultimate good; and let him adore and worship that great and good Being, who has, even in this state of discipline and probation, dispensed so many blessings to alleviate its necessary and unavoidable evils.—*Smellie's Phil. Nat. Hist.*

THE BEAVER.

Next to the intelligence exhibited in human society, that of the Beavers is the most conspicuous. Their operations in preparing, fashioning, and transporting the heavy materials for building their winter habitations, as formerly remarked, are truly astonishing; and, when we read their history, we are apt to think that we are perusing the history of man in a period of society not inconsiderably advanced.

The society of beavers is a society of peace and of affection. They never quarrel or injure one another, but live together in different numbers, according to the dimensions of particular cabins, in the most perfect harmony. The principle of their union is neither monarchical nor despotic: for the inhabitants of the different cabins, as well as those of the whole village, seem to acknowledge no chief or leader whatever. Their association presents to our observation a model of a pure and perfect republic, the only basis of which is mutual and unequivocal attachment. They have no law but the law of love and of parental affection. Humanity prompts us to wish that it were possible to establish republics of this kind among mankind. But the dispositions of men have little affinity to those of the beavers.

The Beaver is about three feet in length, and its tail, which is of an oval figure, and covered with scales, is eleven inches long. He uses his tail as a rudder to direct his course in the water. In places much frequented by man, the beavers neither associate nor build habitations. But in the northern regions of both continents, they assemble in the months of June or July, for the purpose of uniting into society, and of building a city. From all quarters they arrive in numbers, and soon form a troop of two or three hundred. The operations and architecture of the beavers are so well described by the Count de Buffon, that we shall lay it before our readers nearly in his own words. The place of rendezvous, he remarks, is generally the situation fixed upon for their establishment, and it is always on the banks of waters. If the waters be flat, and seldom rise above their ordinary level, as in lakes, the beavers make no bank or dam. But in rivers or brooks, where the water is subject to risings and fallings, they build a bank, which traverses the river from one side to the other, like a sluice, and is often from eighty to a hundred feet long, by ten or twelve broad at the base. This pile, for animals of so small a size, (the largest beavers weighing only fifty or sixty

pounds) appears to be enormous, and presupposes an incredible labor. But the solidity with which the work is constructed, is still more astonishing than its magnitude. The part of the river where they erect this bank is generally shallow. If they find on the margin a large tree, which can be made to fall into the river, they begin by cutting it down, to form the principal basis of their work. This tree is often thicker than a man's body. By gnawing it at the bottom with their four cutting teeth, they in a short time accomplish their purpose, and always make the tree fall across the river. They next cut the branches from the trunk to make it lie level. These operations are performed by the joint industry of the whole community. Some of them, at the same time, traverse the banks of the river, and cut down smaller trees, from the size of a man's leg to that of his thigh. These they cut to a certain length, dress them into stakes, and first drag them by land to the margin of the river, and then by water to the place where the building is carrying on. These piles they sink down, and interweave the branches with the larger stakes. In performing this operation, many difficulties are to be surmounted. In order to dress these stakes, and to put them in a situation nearly perpendicular, some of the beavers must elevate with their teeth, the thick ends against the margin of the river, or against the cross tree, while others plunge to the bottom, and dig holes with their fore feet, to receive the points, that they may stand on end. When some are laboring in this manner, others bring earth in their mouths and with their fore feet, and transport it in such quantities, that they fill with it all the intervals between the piles. These piles consist of several rows of stakes of equal height, all placed opposite to each other, and extend from one bank of the river to the other. The stakes facing the lower part of the river are placed perpendicularly; but those which are opposed to the stream slope upward, to sustain the pressure of the water; so that the bank, which is ten or twelve feet wide at the base, is reduced to two or three at the top. Near the top, or thinnest part of the bank, the beavers make two or three sloping holes, to allow the surface water to escape. These they enlarge or contract in proportion as the river rises or falls; and when any breaches are made in the bank by sudden or violent inundations, they know how to repair them when the water subsides.

Hitherto all these operations were performed by the united force and dexterity of the whole community. They now separate into smaller societies, which build cabins or houses. These cabins are

constructed upon piles near the margin of the river or pond, and have two openings, one for the animals going to the land, and the other for throwing themselves into the water. The form of these edifices is either round or oval, and they vary in size from four or five, to eight or ten feet in diameter. Some of them consist of three or four stories, their walls are about two feet thick; and are raised perpendicularly upon planks, or plain stakes, which serve both for foundations and floors to their houses. When they consist of but one story, they rise perpendicularly a few feet only, afterwards assume a curved form, and terminate in a dome or vault, which answers the purpose of a roof. They are built with amazing solidity, and neatly plastered with a kind of stucco both within and without. In the application of this mortar the tails of the beavers serve for trowels, and their feet for plashing. Their houses are impenetrable to rain, and resist the most impetuous winds. In their construction, they employ different materials, as wood, stone, and a kind of sandy earth, which is not liable to be dissolved in water. The wood they use is generally of the light and tender kinds, as alders, poplars, and willows, which commonly grow on the banks of rivers, and are more easily barked, cut, and transported, than the heavier and more solid species of timber. They always begin the operation of cutting trees at a foot or a foot and a half above the ground. They labor in a sitting posture; and, besides the convenience of this posture, they enjoy the pleasure of gnawing perpetually the bark and wood, which are their favorite food. Of these provisions they lay up ample stores in their cabins to support them during the winter. Each cabin has its own magazine, which is proportioned to the number of its inhabitants, who have all a common right to the store, and never pillage their neighbors. Some villages are composed of twenty or twenty-five cabins. But these large establishments are not frequent; and the common republics seldom exceed ten or twelve families, while each have their own quarter of the village, their own magazine, and their separate habitation. The smallest cabins contain two, four, or six, and the largest eighteen, twenty, and sometimes thirty beavers. As to males and females, they are almost equally paired. Upon a moderate computation, therefore, the society is often composed of a hundred and fifty or two hundred, who all, at first, labor jointly in raising the great public building, and afterwards, in select tribes or companies, in making particular habitations. In this society, however numerous, an universal peace is maintained. Their union is cemented by com-

mon labors; and it is perpetuated by mutual conveniency, and the abundance of provisions which they amass and consume together. A simple taste, moderate appetites, and an aversion to blood and carnage, render them destitute of the ideas of rapine and of war. Friends to each other, if they have any foreign enemies, they know how to avoid them. When danger approaches, they advertise one another, by striking their broad tail on the surface of the water, the noise of which is heard at a great distance, and resounds through all the vaults of their habitations. Each individual, upon these occasions, consults his own safety; some plunge into the water; others conceal themselves within their walls, which can be penetrated only by the fire of heaven, or the steel of man, and which no animal will attempt either to open or to overturn. These retreats are not only safe, but neat and commodious. The floors are spread over with verdure; the branches of the box and of the fir, serve them for carpets, upon which they permit not the smallest dirtiness. The window that faces the water answers for a balcony to receive the fresh air, and for the purpose of bathing. During the greater part of the day, the beavers sit on end, with their head and the anterior parts of their body elevated, and their posterior parts sunk in the water. The aperture of this window is sufficiently raised to prevent its being stopped up with the ice, which, in the beaver climates, is often two or three feet thick. When this accident happens, they slope the sole of the window, cut obliquely the stakes which support it, and thus open a communication with the unfrozen water. They often swim a long way under the ice. In September, the beavers collect their provisions of bark and of wood. Till the end of winter, they remain in their cabins, enjoy the fruits of their labors, and taste the sweets of domestic happiness. This is their time of repose. In the spring they separate; the males retire into the country to enjoy the pleasures and fruits of spring. They return occasionally, however, to their cabins; but dwell there no more. The females continue in the cabins, and are occupied in nursing, protecting and rearing their young, which, in a few weeks, are in a condition to follow their dams. The beavers assemble not again till autumn, unless their banks or cabins be injured by inundations; for, when accidents of this kind happen, they suddenly collect their forces and repair the breaches that have been made.

This account of the society and operations of beavers, however marvellous it may appear, has been established and confirmed by so many credible eye-witnesses, that it is impossible to doubt of its reality.—*Smellie's Phil. Nat. Hist.*

GREAT AMERICAN SEA-EAGLE;
OR,
"BIRD OF WASHINGTON."

The Eagle possesses, in an eminent degree, the faculty of vision; its eye is remarkably keen and penetrating, although deep sunk, and covered by a projecting brow; and the iris, being of a fine, bright yellow, shines with extraordinary lustre. Its general color is a deep brown, mixed with tawny on the head and neck. The tail is black, spotted with ash color; the legs are yellow, and feathered down to the toes; and the claws are remarkably large and strong.

Of all the feathered race, the Eagle soars to the greatest height, and for this reason has obtained, among the ancients, the appellation of the bird of Jove. His strength of wing is so great, that he

is able to carry off hares, lambs, kids; and has been known to carry off even infants. They are very formidable, particularly when rearing their young, which they defend with great force and bravery. They generally make their nests in the highest and most inaccessible cliffs, usually selecting some sheltered place. The Eagle lays three, and sometimes four eggs; but it does not often happen that more than two are prolific.

There are many varieties of this bird; such as the Sea Eagle, the Golden Eagle, the Bald Eagle, the Ringtailed Eagle, the Common Eagle, the White Eagle, the Rough-footed Eagle, the Black Eagle, the Osprey Eagle, and the Crowned Eagle. The drawing, on the preceding page, represents one of the first named species; it was taken from one killed by the well known naturalist, J. J. Audobon, who thinks it peculiar to America; and who, on that account, and also on account of its being the largest of the species, gave it the name of "*Falco Washingtoniana*," or "*Bird of Washington.*" The male bird of this species weighs 14½ lbs.; measures 3 feet 7 inches in length, and 10 feet 2 inches in extent. The upper mandible (beak) 3 3-8 in. dark bluish black. Mouth blue; tongue the same; eye large, of a fine chesnut color; iris black, the whole protected above by a broad, strong, boney, cartilaginious substance, giving the eye the appearance of being much sunk; upper part of the head, neck, back, rump, and tail feathers, dark, coppery, glossy brown; front of the neck, breast and belly, rich cinnamon color; claws strong, much hooked, blue-black, and glossy. The Eagle is a long lived bird; its usual age is estimated at 60 years; but there are instances of its having attained the age of 100 years. Its power of supporting abstinence is very great, being able to live from 3 to 5 weeks without eating.—*See Comstock's Natural History of Birds; Wilson's Ornithology*, &c.

THE SAGACITY OF THE DOG.

Every person has seen, more or less, of the sagacity of this "companion of man." There was one formerly belonging to a grocer in Edinburgh, which, for some time, amused and astonished the people in the neighborhood. A man who went through the streets ringing a bell and selling penny pies, happened one day to treat this dog with a pie. The next time he heard the pie-man's bell, he ran to him with impetuosity, seized him by the coat, and would not suffer him to pass. The pie-man; who understood what

the animal wanted, showed him a penny, and pointed to his master, who stood in the street door, and saw what was going on. The dog immediately supplicated his master by many humble gestures and looks. The master put a penny into the dog's mouth, which he instantly delivered to the pieman, and received his pie. This traffic between the pie-man and the grocer's dog, was daily practised for several months.—*Smellie's Philo. of Nat. Hist.*

NATURAL PHILOSOPHY.

PNEUMATICS.

That branch of Natural Philosophy, which treats of the nature, properties and effect of the atmosphere, or body of air encompassing the earth, is called Pneumatics. The air is that transparent fluid in which we live and move. It encompasses the whole earth to a considerable height, and together with the clouds and vapors which float in it, is called the atmosphere. The air is justly reckoned among the fluids, because it has all the other properties by which a fluid is distinguished; for it yields to the least pressure, its parts are easily moved among themselves, it presses according to its perpendicular altitude, and its pressure is every where equal.

The air differs from all other fluids in the three following particulars: 1st. It can be compressed into much less space than it naturally occupies, which no other fluid can be, except the gases. 2. It cannot be congealed or fixed like other fluids. 3. It is of a different density at different heights from the earth's surface, decreasing the higher it rises; for each stratum is compressed only by the weight of those above it; the upper strata are, therefore, less compressed, and of course less dense, than those below them.

That the air is a real substance, or body, is evident from its excluding all other bodies from the space which it occupies: for if a glass jar or bottle be plunged into a vessel of water with its mouth downwards, very little water will get into it, the air inside keeping the water out, the little that the water will rise in the neck of the jar or bottle, is owing to the air being compressed into a smaller space by the force which is applied to the jar to keep it down.

As the air is a real substance, it must necessarily have weight:

and that this is the case, is easily demonstrated by experiment. For if the air be extracted from a vessel by means of the air pump, and the result be afterwards weighed, it will be considerably lighter than it was before the air was extracted; or which amounts to the same thing, it will be considerably heavier after the air is again let into it. Thus a bottle that contains a quart, will be found to be 18 grains heavier when full of air, than when the air is extracted from it. The weight of the air is also ascertained by the instrument called the Barometer. For the air presses on the orifice of the inverted tube with a force just equal to the weight of the column of mercury sustained by it—a column of 29½ inches in height.

The pressure or weight of the atmosphere is about 14 pounds on every square inch of the earth's surface. Hence the total pressure on the whole surface of the earth is 10,686,000,000,000,000,000 pounds.

The air being of an elastic, or springy nature, it is plain that it must be more dense or pressed at the earth's surface than at any considerable height above it; and that the greater the height, the less must be the density. The law by which the density and elasticity diminish, has been determined by several philosophers, and may be thus stated: if altitude be taken from the earth's surface, in arithmetical progression, the densities of the strata of air will decrease in geometrical progression. For example, at 3½ miles height, the density or weight of the air will be only half what it is at the earth's surface; at 7 miles height, one fourth; at 10½ miles, one eighth; at 14 miles, one sixteenth, and so on.

From the effect of this law, it is easy to perceive, that a small quantity of air, a cubic inch, for example, at the earth's surface, would be so much rarefied at the altitude of 500 miles, as to occupy a very great space. It must also be evident that no person could breathe or live for a moment at so small a height as 20 miles, or even at the top of some of the mountains on the earth; none of which exceed five and a quarter miles in height.

When the end of a tube or pipe is immersed in water, and the air extracted from the tube, the water will rise in it to the height of 33 feet above the surface of the water in which it is immersed, but will rise no higher; and this is the greatest height to which water can be raised by the common suction pump. Now, as it is the pressure of the atmosphere on the surface of the water which causes it to rise in the pump, and follow the piston when the air

above it is lifted up, it is evident that a column of water 33 feet high is equal in weight to a column of quicksilver of the same base 29½ inches high, and to a column of air having the same base, and reaching to the top of the atmosphere. In calm, serene weather, the air is capable of supporting a column of quicksilver, 31 inches high; but in rainy or stormy weather, often not above 28 inches. Hence the rising and falling of the quicksilver, in the tube of a barometer, is an excellent indication of the changes which take place in the weight of the atmosphere. In all that has been said of the weight of the air, its temperature is supposed to remain unchanged; but it is well known that this is not the case for any length of time, and that its density is very much diminished by heat.

The temperature of the air diminishes on ascending into the atmosphere, both on account of the greater distance from the earth, the principal source of its heat, and the greater power of absorbing heat, which the air acquires by being compressed. The heat, however, appears not to decrease in the same ratio that the distance increases. That is, the temperature, at any particular height from the earth, is not double what it is at twice that height. M. de Saussure found, that by ascending from Geneva to Chamouni, a height of about 2220 feet, the thermometer fell 9½ degrees; and that, on ascending from thence to the top of Mont Blanc, about 12,500 feet more, it fell 46½ degrees. The first of these gives a diminution of 1 degree for 221 feet; and the second 1 degree for every 268 feet. However, it may be inferred, that the decrease of temperature, for the greatest heights which we can reach, is not far from uniform; and the average may be estimated at one degree for every 270 feet perpendicular height.—*Artisan.*

(*To be Continued.*)

VELOCITY OF LIGHT.

Light travels at the inconceivable rate of 190,000 miles per second!! This fact was first discovered by observing that the eclipses of Jupiter's satellites, uniformly took place 16 1-2 minutes later when that planet was on the opposite side of the earth from the sun, than when it was on the same side; that is, when it was farther from us by the distance of the diameter of the earth's orbit, (the circle in which it moves round the sun) which is 190,000,000 miles; and in proportionably less time for a less dis-

tance. Dr. Bradley, a distinguished English Astronomer, calculated the distance of the fixed star Draconis, to be at least 400,000 times that of the sun from the earth; allowing that to be the case, and we see nothing improbable in the conjecture, it would require above six years for a ray of light, coming from that star to reach us. The celebrated Huygens, supposed it not impossible that there may be stars at such immense distances that their light, though travelling at the rate above mentioned, has not yet reached the earth!! When we take into consideration, the probable fact, that these stars are suns that impart light and heat to other systems, inhabited like our own, and that these systems are scattered through an infinity of space, the imagination has not power to conceive the immensity of the Universe, and the mind is lost in contemplation.

VELOCITY OF SOUND.

Sound travels at the rate of 1142 feet in a second, or nearly 13 miles per minute. From a knowledge of this fact, a person may very easily calculate the distance, or danger of a thunder cloud. The pulsations of a healthy person are near enough to seconds to answer all the purposes of a stop watch, by which to count the time. Let a person, on seeing the flash of lightning, count the number of pulsations between that and the report, or clap of thunder: if they be 60, it is evident the thunder cloud is 13 miles distant; if 30, 6 1-2 miles; if 15, 3 1-4 miles, and so on; and he need not apprehend any danger so long as he can count five pulsations between the flash of lightning and clap of thunder.

MECHANICS.

OF THE STRENGTH OF MEN AND ANIMALS.

The form and construction of the human body renders it peculiarly applicable, as the first mover of machinery; and what it wants in strength, is compensated to a great degree by the skill and judgment with which it can be applied. Considering the great number of cases in which it is impossible to employ other than human agents, it becomes a matter of some importance to ascertain the way in which

the greatest quantity of work can be performed by a man with the least bodily fatigue, or with such fatigue only as he can bear, from day to day, without injury to his health.

By various experiments, Mr. Coulomb was enabled to form the following

TABLE,

Showing the quantity of action a man can furnish in a day, when his strength is exerted in various ways.

	lbs.	feet
1. When he walks on level ground, unloaded, the mechanical effect is	5517	3281
2. When he walks with 128 lbs. and returns unloaded for another burden,	1822	"
3. When he walks always loaded,	2006	"
4. When he carries a load on a wheelbarrow, it is	2250	"
5. When he ascends a stair unloaded, the mechanical effect is	480	"
6. When he ascend a stair loaded with 128 lbs. the usual effect is	122	"
7. When he turns a winch, the useful effect is	256	"

In estimating the relative power of horses and men, *one* of the former is considered equal to five of the latter. It is also estimated that a horse will draw, with the force of 200 lbs. 2½ miles per hour, and continue this action 8 hours out of 24.

NOTE. By the force of any power, in *pounds*, must be understood that force which the given number of pounds, suspended by a cord, passing over a pully, and attached to the load to be moved would exert upon it.

The following Table shews the relative strength of an overshot wheel, 10 feet in diameter, the Steam Engine, Horses and Men.

110 gallons water delivered on an overshot wheel 10 feet diameter per minute	Diameter of the cylinder of the Engine in inches.	No. horses working 12 hrs in a day, and moving at the rate of 2 miles per hour.	No. of men working 12 hrs in a day.	Height to which these will raise 1000 lbs. per minute.
230	612	1	5	13
790	935	5	25	65
1,587	142	10	50	130
2,500	178	15	75	195
3,420	207	20	100	260
5,252	255	30	150	390

METHOD OF CALCULATING THE POWER OF A HIGH PRESSURE STEAM ENGINE.

Multiply the diameter of the piston by 3,1459, and this product again by half the diameter ; divide the last product by 2, which will give the area of the piston in inches, multiply the dividend by the pressure the engine will bear upon the square inch, which will give

its power in pounds: again, multiply its power by the number of strokes the engine makes per minute, and that product by the length of the stroke it makes, which will give the number of pounds the engine will raise, one foot per minute.

Example: suppose the piston to be 28 in. diameter; multiply this by 3,1459; the product would be 88,0852; multiply this again by half the diameter 14, the product would be 1233,1928, divide by 2 = 616,5964; multiply this dividend by the pressure the engine will bear on the square inch, say 16 pounds, = 9865, and a fraction pounds; suppose the piston to make 20 *double* strokes of 6 feet length per minute; multiply the pounds by 40 (strokes), = 394,600 and this again by 6 = 2,367,600; which is the number of pounds such an engine would raise *one* foot per minute. Now if we estimate the power of a horse as equal to the raising of 30,000 pounds one foot per minute, such an engine would be equal to 78 2-3 horse power.

AGRICULTURE.

THE CULTURE OF SILK.

It is with great pleasure we perceive the exertions of a few intelligent individuals to draw the attention of the American people to the important and interesting subject of the culture of silk. No article of produce is, in our estimation, more worthy the notice of our farmers; nor do we believe there is one from the cultivation of which, they can derive more profit in proportion to the capital and labor required. It is not our purpose, at present, to treat this subject in detail. This has been so ably done by Dr. Pascalis of this city, and by Messrs. Du Ponceau and D'Homergue, of Philadelphia, that we only deem it necessary to refer those who are anxious to gain a thorough knowledge of the subject to the publications of those gentlemen; all we propose at this time, is, to endeavor to exhibit the subject in its proper light to those (and there are, unfortunately, many such) who have either thought it not worth their attention, or have supposed a knowledge of it beyond their attainment. The first legislative act, relative to the growth of the Mulberry tree and the Breeding of Silk Worms for the purpose of producing Silk, seems to owe its origin to Mr. Miner, a very useful member of Congress from Pennsylvania, who, on the 29th

of December, 1825, introduced a Resolution, which was adopted by the House of Representatives, instructing the Committee on Agriculture to inquire into, and make a report upon, the subject. The required Report was made on the 2d of May, 1826, by Gen. Van Rensselaer, Chairman of the Committee. In this report, the committee state, that "the facts developed, in the course of their inquiries, tend to place the subject in an important point of view." "It is an interesting fact," say they, "that the Mulberry tree grows indigenously throughout the United States, and that Silk may be raised with facility from the southern to the northern boundary of the Union. In Georgia," the Committee state, "considerable quantities of silk were formerly produced." The production of the article was suspended from causes connected with the revolution. "In Kentucky, the committee learn that sewing silk is now produced in considerable quantities, and of excellent quality. The Committee also state, that "the value of the silk produced in Windham County, Connecticut, in 1810, was estimated at $27,373;" and that it is still attended to and found profitable. Of the fact, therefore, that the United States can produce silk for its own consumption, and even for exportation to the extent of foreign demand, there appears no reason to doubt. There are few persons, the committee believe, even among the most intelligent of our citizens, (who have not turned their attention particularly to the subject) who will not be surprised at the view presented by the following official statement of the value of silks imported into the United States for the last five years:

Statement of the value of silk goods imported and exported in the years 1821 to 1825, inclusive.

Years.	Imported.	Exported.
1821	$4,486,924	$1.057,233
1822	6,480,928	1,016,262
1823	6,703,771	1,512,449
1824	7,203,344	1,816,325
1825	10,271,527	2,565,742
	$35,156,494	$7,968,011

What a bounty is paid by us to support the Agriculturist and Manufacturer of other nations, on articles which our country, with a few years' care, might supply! How important it is that the Agriculturist should turn his attention to new objects of production, is very fully shown by the circumstance of the diminished and diminishing demand of bread stuffs abroad.

In 1817, the exports of bread stuffs amounted to $20,374,000.

In 1818, to $15,388,000. In 1824, to $6,799,246. In 1825, to $5,417,997.

"An importation," exclaim the committee, "of ten millions of dollars of silks; an export of five millions of bread stuffs! The facts speak the importance of the subject, and indicate the necessity that exists, of awakening the slumbering agricultural resources of our country, by introducing new and profitable articles of production." In conclusion, the committee recommended the adoption of a resolution, directing the Secretary of the Treasury to cause to be prepared a Manual, containing the best practical information that can be collected on the growth and manufacture of silk, &c. This Manual was prepared accordingly, and laid before Congress, and six thousand copies ordered to be printed. The result of all this, however, has not been adequate to the importance of the subject, or the labor bestowed upon it. We would not be understood as recommending to our farmers to abandon the cultivation of any of the crops that they now raise, for the purpose of turning their attention to the culture of silk—no such thing; on the contrary, we would say to them, "pursue your present employments, only take time, simply to plant a few Mulberry trees along your fences, around your houses, and upon such parts of your land as are not worth cultivating;" the leaves of these trees, which will come to maturity, in a very few years, constitute the food of the silk worm. After this has been done, all the rest can be performed by children and females, and here is the great advantage they would derive from the cultivation of silk. Since the extensive introduction of machinery, to perform that labor which was formerly done *at home*, the females of the country are left, comparatively, without employment; the cultivation of silk would not only enable them to contribute something to the common stock of the family, but would be one of the most agreeable and interesting occupations they could possibly engage in. How laudable would be their ambition to excel those of all other nations, as well as each other, in the production of that richest and most beautiful article which adorns their persons. Then, indeed, would they "make themselves coverings of tapestry, and clothing of silk and purple;" nor would they "eat of the bread of idleness;" but "their children would rise up and call them blessed, and their husbands would praise them." It is said, that in the little town of Mansfield, in Connecticut, there are 100 families that annually raise about 2600 pounds of silk, which is manufactured into sewing silk, of the best

quality, and which yields them a profit of $10 a pound, or $26,000; and this is done, almost exclusively, by the labor of the women and children. We trust we have already said enough to excite the attention of the farmers to this important subject, and will only add, in conclusion, the words of an eminent member of the Agricultural society of this State: "You have, in your hands, all the means requisite for success, and for enriching yourselves by the culture of silk. It remains with you to improve" those means which the God of nature has put into your hands. We shall advert to this subject again hereafter; in the meantime, we beg leave to recommend to the notice of our readers two numbers of "The Silk Culturist," or "Practical Instructions for the Culture of Silk and the Mulberry Tree," published in this city, by Felix Pascalis, M. D. in which they will find the subject treated in a very lucid and practical manner.

STATISTICS.

An estimate of the comparative amount of animate and inanimate force applied to Agriculture and the Arts in France and Great Britain.

Mr. Dupin estimates the animal force of France to be equivalent to 12,609,057 effective men; two thirds of which are engaged in agriculture, and the other third in manufactures, commerce, &c. He also estimates the force of the horses, oxen and asses employed in agriculture, to be equal to the power of 28,872,000 men; and those employed in manufacturing, &c. equal to the power of 2,100,000; which gives a total of the estimate force of

France equal to	43,581,057 men;
namely; employed in agriculture . . .	37,278,038 men;
in commerce, manufactures, &c. . . .	6,303,019

Assuming the population of Great Britain to be 15,000,000, and that two thirds of the effective force are engaged in commerce (estimating it in the same ratio as that of France,) in manufactures, &c. and that the horses, oxen, &c. also used in agriculture, are equivalent to 22,500,000 men, he makes a total animate force engaged in agriculture, of 24,632,456
That of Ireland is estimated at 7,455,701

Total, ... 32,088,147

On the same data, the human force of Great Britain employed in Commerce, Manufactures, &c. is . . . 4,264,893
to which add that of horses, oxen, &c. equivalent to 1,750,000

6,014,893
That of Ireland, ... 1,260,604
which gives a total animate commercial and manufacturing force equal to . . . . . *men*—7,275,497
Total animate force of Great Britain, equal to *men*—43,581,075

The inanimate force employed in France, such as steam engines, water power, &c. the same author estimates to be equal to the power of 5,233,333 men ; and that of Great Britain equal to the power of 20,842.667 men : consequently, we have the following result of the comparative estimate of the animate and inanimate force employed in both countries ; namely,

	FRANCE.	GRT. BRITAIN.
Agricultural force . . .	37,278,038	32,088,147
Commercial and Manufacturing, do.	11,536,352	28,118,164
Total,	48,814,390	60,116,302

EXPORTS AND IMPORTS OF THE UNITED STATES.

It appears by the Report of the Secretary of the Treasury, that the total amount of articles, of the growth and manufacture of the United States, exported to Foreign Countries during the year ending 30th September, 1829, was 55,700,193

The following are some of the items constituting this amount, namely :

Of manufactured Cotton Goods,	$1,259,457
Hats,	270,780
Leather, Boots and Shoes,	356,658
Wood (including carriages)	501,946
Iron,	223,705
Combs and Buttons,	76,250
Wearing apparel,	91,108
Artificial flowers and Jewelry,	21,627
Agricultural products, exclusive of Cotton, Rice, and Tobacco,	14,213,339
Fisheries,	1,817,100

Of the DOMESTIC COTTON GOODS, the amount of $25,913 were exported to CHINA; $9,553 to the BRITISH EAST INDIES; $5,777 to the DUTCH EAST INDIES; $10,080 to TRIESTE AND OTHER AUSTRIAN PORTS; $20,420 to THE CAPE DE VERD ISLANDS.

The whole amount of Exports during the same time was $72,358,671, and the whole amount of *Imports* was $74,492,527: of the *Imports*, $69,325,552 were imported in American, and $5,166,975 in Foreign vessels. Of the *Exports*, $62,089,331 were exported in American, and $12,413,086 in Foreign vessels.

EDUCATION.

The Quarterly Journal of the American Education Society for May, contains a register of all the schools in New-England and New-York, with their full statistics, and of the colleges and professional schools throughout the United States. Of the Colleges, the total result of the particulars is as follows:—

Colleges in the United States,	46
Instructors at 39 colleges,	290
Whole number of alumni at 30 colleges,	21,693
Alumni living at 26 Colleges,	12,784
Alumni ministers at 23 colleges,	4,671
Ministers living at 21 colleges,	2,272
Graduates at 35 colleges,	700
Seniors at 33 colleges,	720
Juniors at 34 colleges,	860
Sophomores at 32 colleges,	840
Freshmen at 28 colleges	700
Total at 40 colleges,	3,582
Prof. of religion at 27 colleges,	683
Assisted by college funds at 16 colleges,	300
Do. by Educ. Soc. at 17 colleges,	196
Medical students at 11 colleges,	1,220
Law students at 5 colleges,	87
Volumes in 27 college libraries,	149,704
Do. in social libraries in 30 colleges,	69,281

The following comparative summary is deduced:—

East. States—1 student to 1,231 inhabitants; *Mid. States*—1 student to 3,465; *South. States*—1 student to 7,232; *West. States*, 1 student to 6,060.

There are 21 Theological Seminaries; 13 report 693 students; 14 libraries have 45,000 volumes.

POPULATION, SOVEREIGNS, &c. OF EUROPE.

	STATES AND TITLES.	Surface in Geo. sq. mi.	Population.	Reigning Sovereign, or Head of Government.
	Surface 2,793,000 Geographical sq. miles. Population, 227,700,000 Inhabitants.			
	CENTRAL STATES.			
1	French Monarchy	154,000	33,000,000	Charles X. 1824
	Total of French Monarchy	188,000	32,554,000	
2	Austrian Empire	194,500	32,000,000	Francis I. 1792
3	Prussian Monarchy	80,450	12,464,000	Frederic Wm. III. 1797
4	Monarchy of the Netherlands,	19,000	6,143,000	William I. ..... 1815 Stadtholder ... 1806
	Total of the Monarchy of the Netherlands	252,000	15,562 000	
5	Swiss Confederation	11,200	1,980,000	Junker David Wyss Landmann
6	Kingdom of Bavaria	22,120	3,960,000	Louis I. 1825
7	Kingdom of Wirtemberg	5,720	1,520,000	William I. 1816
8	Kingdom of Hanover	11,125	1,550,000	George IV. 1820
9	Kingdom of Saxony	4,341	1,400,000	Anthony 1827
10	Grand Duchy of Baden	4,480	1,130,000	Louis 1808
11	Grand Duchy of Hesse	2,826	700,000	Louis I. 1790
12	Electorate of Hesse	3,344	592,000	William II. 1821
13	Grand Duchy of Saxe Weimar	1,070	222,000	Charles Fred. ... 1828
14	Do. of Mecklenberg-Schwerin	3,582	431,000	Francis 1785
15	Do. of Mecklenberg-Strelitz	578	77,000	George 1816
16	Do. of Holstein-Oldenburgh	1,880	241,000	Peter, ... 1823
17	Duchy of Nassau	1,446	337,000	William 1816
18	Duchy of Brunswick	1,126	242,000	Charles 1815
19	Duchy of Saxe-Cobourg Gotha	731	143,000	Ernest 1826
20	Duchy of Saxe-Meiningen	691	130,000	Bernard 1803
21	Duchy of Saxe-Altenburgh	397	104,000	Frederic 1780
22	Duchy of Anhalt-Dessau	261	56,000	Leopold 1817
23	Duchy of Anhalt-Berneburgh	253	38,000	Alexis 1796
24	Duchy of Anhalt-Koethen	240	34,000	Ferdinand 1818
25	Princip. of Schwarz-Rudolstat	306	57,000	Gunther Fred. .. 1807
26	Prin. of Schwarz-Sondershausen	270	48,000	Gunther Fred Charles 1794
27	Principality of Reuss-Greitz	109	23,000	Henry XIX. 1817
28	Princip. of Reuss-Schleitz	156	28,000	Henry LXII. 1818
29	P. of Reuss-Lobenst-Ebersdorf	182	26,000	Henry LXXII. ... 1822
30	Principality of Lippe-Detmold	330	72,000	Leopold 1802
31	Princip of Lippe-Schauhenburg	157	26,000	George Wm. ... 1787
32	Principality of Waldeck	347	54 000	George 1813
33	P. of Hohenzorllern Sigmaringen	293	38,000	Anthony 1785
34	P. of Hohezollern-Hechingen	82	15,000	Frederic 1810
35	Prin. of Liechtenstein	40	6,000	John 1805
36	Landgrave of Hesse Homb'rgh	125	20,000	Frederic 1820
37	Republic of Francfort	69	52,000	De. Malapert, (Burgomaster.)
38	Republic of Bremen	51	49,000	Grœning, Schmidt, Nownen, Dantze, (B.)
39	Republic of Hamburgh	114	148,000	Amsink, Heise, Bartels & Koch, (Bur.)
40	Republic of Lubeck	88	41,000	Beneke, Kindler. Boeg & Evers, (Burg.)
41	Lordship of Kniphausen	13	2,859	Wm Gusta. Fred. 1825

GERMANIC CONFEDERATION.

	STATES AND TITLES.	Surface in Geog. Sq. miles	Population.	Reigning Sovereign, or Head of Government.
	SOUTHERN STATES.			
42	Republic of Andora, (Spain)	144	15,000	Mag. of the republic.
ITALY. 43	Republic of San Marino	17	7,000	2 Quarterly Chiefs.
44	Duchy of Massa	71	29,000	Maria Beatrice, 1814
45	Duchy of Modena	1500	350,000	Francis IV. 1814
46	Principality of Monaco	38	6,500	Honorious, ... 1819
47	Duchy of Lucca	312	143,000	Charles 1824
48	Duchy of Parma	1,680	440,000	Maria Louisa ... 1814
49	Grand Duchy of Tuscany	6,324	1,275,000	Leopold II. 1824
50	Kingdom of Sardinia	21,000	4,300,000	Felix 1821
51	State of the Church	13,000	2,590,000	Leo XII. 1823
52	Kingdom of the Two Sicilies	31,800	7,420,000	Francis I. 1825
53	Spanish Monarchy	137,400	13,900,000	Ferdinand VII. 1808
	Total of the Spanish Monarchy	214,400	17,988,000	
54	Portuguese Monarchy	29,150	3,530,000	Miguel 1829
	Total of the Portuguese Monarchy,	430,000	5,607,000	
	NORTHERN STATES.			
55	Monarchy of Sweden and Norway	223,000	3,866,000	Charles XIV. ... 1818
56	Danish Monarchy	16,500	1,950,000	Frederic VI. 1808
	Total of the Danish Monarchy	341,000	2,125,000	
57	British Monarchy	90,948	23,400,000	George IV. 1820
	Total of the British Monarchy	4,457,598	140,450,000	
58	Russian Empire	1,499,000	52,625,000	Nicholas I. 1826
	Kingdom of Poland	36,700	3,900,000	
	Total of the Russian Empire	5,912,000	60,000,000	[Wodxicky, 1824
59	Republic of Cracow	373	114,000	Count Stanislaus, of
60	Ottoman Empire	155,000	9,500,000	Mahmoud II. .. 1808
	Total of the Ottoman Empire	1,078,000	25,000,000	
61	Republic of the Ionian Isles	754	176,000	Prince Anthony Comuto, President.

NOTE.—Where a state has possessions in other countries than that of Europe, a second line is given, to show the total of their possessions, population, &c.

POPULATION OF THE SOUTH AMERICAN STATES.

According to the latest inquiries into the amount of the different populations of the South American States, it appears that they contain near 21,650,000 inhabitants. Mexico is the most populous, containing about 9,000,000. Brazil comes next, and has about half that number. It has been likewise calculated that in all America there are 11,650,000 persons who speak English—10,580,000 who speak Spanish—3,750,000 Portuguese—and 1,200,000 speaking French—finally, 7,500,000 speaking the indigenous dialects.

MISCELLANY.

PATENT MOWING MACHINE.

A machine was exhibited in this town, last week, which excited some curiosity, from the novelty of its design; it was an apparatus for mowing by horse power. It consists of an axle-tree with two wheels: on the axle-tree is a drum of smaller dimensions; from which a band extends to the tub of another large vertical wheel, situated in front of the axle-tree. On the outer edge of this wheel is placed a succession of scythes, and in front of the whole, are the shafts for the horse. When the apparatus is put in motion, as the axle revolves, the band plays from the drum upon the hub of the vertical wheel, which is placed upon a pair of thin runners near the ground, and it revolves with astonishing force, levelling all before it. It requires the most level ground and smooth surface upon which it is to operate to advantage, and any irregularities of soil, render it almost useless. It will perform the labor of about 20 men in a day, on a soil fitted to its operation.—*Northampton Courier.*

INFLUENCE OF LEARNING.

It rarely, very rarely happens, that a man of taste and learning is not, at least, an honest man, whatever frailties may attend him. The bent of his mind is speculative, and studies must mortify in him the passions of interest and ambition, and must, at the same time, give him a greater sensibility of all the decencies and duties of life. He feels more fully a moral distinction in characters and manners: nor is his sense of this kind diminished, but on the contrary is much increased by speculation.

EMIGRATION.

The influx of foreigners into the United States, will probably be much greater during this, than any former year; and will, probably, not fall much short of 50,000 persons. Those from England and Scotland, Cobbett says, will not fall short of 13,000, and will bring with them not less than 3,000,000*l.* sterling in gold, (about $12,450,000.) It is also stated, that great numbers of the middling classes of Swiss are on their way to "the land of freedom and of promise." These are the kind of men we want; if they

will only bring *money, industry, good morals* and *steady habits* with them, we will bid them a hearty welcome to our shores.

MACHINE FOR BREAKING STONE.

Mr. Vawter, of Lexington, has invented a machine for breaking stone for McAdamising roads. It is simple and cheap, and answers the purpose very well. It consists of four heavy cast iron pestles moved by two horses on an inclined wheel. The stone is placed in a trough with cast iron grating at the bottom. The machine, as it is at present fixed, breaks stone enough in a day to cover a rod of turnpike; when improved a little, it is thought enough may be prepared, with the same power for 3 rods. It performs the labor of four or five persons hand breaking.

NEEDLES were first made in England by a native of India, in 1545; the art was lost at his death, but recovered again by Christopher Greening, in 1560, who was settled with his children, by Mr. Daner, at Long Gredon, where the manufactory has been carried on from that time to the present day.

LINEN was first made in England in 1253. It was for a long time only worn by the wealthy and luxurious; the generality wore woollen shirts.

Calico was first imported into England in 1631; and first manufactured there in 1772.

Blankets were first manufactured in England in 1340.

A SUBLIME REFLECTION.

"We call ourselves lords of the visible creation: nor ought we, at any time, with affected abjection, to degrade or despise the high gift of rational and immortal existence.—Yet, what is the visible creation? by whom peopled? and where are its entrances and out-goings? Turn wherever we will, we are equally confounded and overpowered: the little and the great are alike beyond our comprehension. If we take the microscope it unfolds to us living beings probably endowed with as complex and perfect a structure as the whale or the elephant, so minute that a million of

millions of them do not occupy a bulk larger than a common grain of sand. If we exchange the microscope for the telescope, we behold man himself reduced to a comparative scale of almost infinitely smaller dimension, fixed to a minute planet that is scarcely perceptible throughout the vast extent of the solar system; while this system itself forms but an insensible point in the multitudinous marshallings of groups of worlds upon worlds, above, below, and on every side of us, that spread through all the immensity of space, and in sublime, though silent harmony, declare the glory of God, and show forth his handy-work."—*Good's Book of Nature.*

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THE ADVANTAGES OF EDUCATION TO THE WORKING CLASSES.

The moral good, which results from the acquisition of knowledge, is chiefly this; that, by multiplying the mental resources, it has a tendency to exalt the character, and, in some measure, to correct and induce the taste for gross sensuality. It enables the possessor to beguile his leisure moments, (and every man has such) in an innocent, at least, if not a useful manner. The poor man who can read, can find entertainment at home, without being tempted to repair to the ale-house for that purpose. His mind can find employment when his body is at rest; he does not lie prostrate and reflect on the current of incidents, liable to be carried whithersoever the impulse of appetite may direct. In the mind of such a man, there is an intellectual spring, urging him to the pursuit of *mental good;* and if the minds of his family are also a little cultivated, his conversation becomes the more interesting, and thus the sphere of his domestic enjoyment is enlarged; the pleasures which lay open to him at the gates of knowledge, put him in a disposition to relish, more exquisitely, the tranquil delight inseparable from the indulgence of conjugal and parental affection: thus he becomes more respectable in the eyes of his family than he who can teach them nothing; he will be naturally induced to cultivate whatever may preserve, and shun whatever would impair that respect. Inured to reflection, he will thus carry his views beyond the present hour; he will extend his prospects a little into futurity, and be disposed to make some provision for his approaching wants, whence will result an increased motive to industry, together with a care to husband his earnings and to avoid unnecessary expense. The poor man who gains a taste for good books, will, in all likelihood, become thought-

ful; and when you have once given the poor man the habit of thinking, you have conferred on him a much greater favor than by the gift of a large sum of money, since you have put into use the *principle* of all legitimate prosperity; for, according to our great philosopher, Bacon, "knowledge is power."—*London Mechanics' Magazine.*

THE SUMMER COMPLAINT OF CHILDREN.

Nearly one-fourth of all the deaths among children under two years of age, in the middle and southern states, are reported to be from the summer complaint alone. To this appalling fact, the attention of parents ought frequently to be directed, more especially as the disease in question is one the prevention of which lies almost entirely within their own power.

Its chief causes are heated and impure air and errors in regard to diet; hence the disease is almost solely confined to large and crowded cities, and is most prevalent among the children of the poorer classes, who inhabit narrow and confined streets, courts and alleys,—who are badly nursed, and have not a sufficient attention paid to the cleanliness of their persons and clothing. In the country it is seldom met with, excepting in the neighborhood of marshes, or of low, wet, and otherwise unhealthy situations.

Children should occupy, always, the largest and most airy room in the house; if possible, on the second floor. The room should be guarded from exposure to the direct rays of the sun, while a constant and free ventilation is kept up. The utmost cleanliness must also be observed in the room as well as in the person and clothing of the children.

During the summer months, the daily use of the cold or tepid bath, while it insures the cleanliness of the skin, is a very powerful means of preventing this disease. It should not, therefore, be neglected, provided there is no circumstance connected with the health and constitution of the child to forbid its employment.

In clear weather, and in the cool of the day, children should be frequently carried abroad, in the most open and healthy parts of the neighborhood; or when the parents have it in their power, a considerable benefit will be derived from repeated rides, in an open carriage into the neighboring country.

The clothing of children should be loose and of a soft texture; and carefully accommodated to the state and changes of the weather, so as to preserve the body of an *even and moderate* temperature. As already remarked, cleanliness of the clothing, as well as of the

skin, is always indispensable to the health and comfort of children, and should, therefore, be zealously attended to.

The breast milk of the mother is the proper and only natural food for an infant; "nature does not afford, nor can art supply, any effectual substitute for this fluid." To it, therefore, should children be almost entirely confined, if circumstances will allow of it, until the process of teething has made some progress. After weaning, their diet should consist of such simple articles as are nutritive, easy of digestion, and but little stimulating; all spices or seasoning, with the exception of salt, all sorts of cakes and pastry, butter in every form, unripe and decayed fruit, and distilled or fermented liquors, must be carefully avoided.

When the disease is present, *many* of the foregoing directions are equally important to ensure its removal, as they are previously in order to guard against its occurence. The circumstance of their being, in general, so little attended to, is one cause of its great fatality.

Parents should, in this, as in every other complaint of children, be upon their guard against the pretensions of empiricism. Let them be assured that no remedy can be devised capable of curing, effectually, the summer complaint of children, unless the latter are removed from the influence of those causes by which the disease has been produced: when such removal is effected at a proper period, the lives of their children may, in almost every instance, be preserved.—*Journal of Health.*